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(54) Title of the Invention:

Method for Manufacturing Tantalum Oxide Layer Capacitor

Abstract:

The present invention relates to a method for manufacturing a tantalum oxide layer. A lower electrode of a capacitor is shaped in a cylinder. A tantalum oxide layer that acts as a dielectric layer is deposited on the lower electrode, and then an upper electrode made out of metal layer is stacked thereon. The tantalum oxide layer is crystallized using a rapid thermal process or thermal processing at a high temperature in a furnace. Therefore, the lower electrode is not oxidized and prevents the formation of a low dielectric layer, which results in increasing the grain size of the tantalum oxide layer and achieving high capacitance. That is, it was difficult to reduce the thickness of an equivalent oxide layer of a tantalum oxide layer to below 30Å in the conventional method. However, when using the manufacturing process of the present invention, it is possible to reduce the thickness to below 25 Å. In addition, when the high temperature thermal process is carried out, the temperature of the tantalum oxide layer rapidly and remarkably increases due to the metal layer deposited on top of the tantalum oxide layer, and the crystallization of its structure is also rapidly performed, thereby reducing default density and increasing induction, which results in increasing current storage capability.